REMARKS

Claim 123 is the sole claim currently pending for examination.

Rejections under 35 U.S.C. §103(a) in view of Melzner and Brandes

Claim 123 has been rejected under 35 U.S.C. §103(a) as being unpatentable over Melzner, *et al.*, U.S. Patent No. 5,774,414 ("Melzner") and Brandes, *et al.*, U.S. Patent No. 6,445,006 ("Brandes").

The Patent Office has maintained its position that one of ordinary skill in the art could combine Melzner and Brandes in order to reach the claimed invention since, although Melzner does not teach the use of nanotubes, one of ordinary skill in the art would combine Melzner and Brandes "to capitalize on the semiconductive properties of carbon nanotubes." Applicants disagree that such a finding is an adequate ground to support a conclusion of obviousness, under the requirements of *KSR* (*KSR International Co. v. Teleflex Inc.*, 550 U.S. 398, 2007) and of M.P.E.P. §2143.

Melzner and Brandes

The Patent Office states that Melzner teaches certain limitations of claim 123, although the Patent Office then acknowledges that Melzner does not show that one of the conductors is a nanotube. The Patent Office then states that:

> Brandes et al. teach (e.g. Figure 9 and Column 2 Lines 31 to 40) to use nanotubes in MEMS devices to capitalize on the semiconducting properties of carbon nanotubes (Column 8 lines 1 and 2) and their unique mechanical end electrical properties (Column 8 Lines 62 to 66). It would have been obvious to a person of ordinary skill in the art at the time of invention to have wires in electrical or Van der Waals contact and made of nanoscopic single or multiwall carbon nanotubes in auxiliary circuitry including transistors, capacitors and contact the electrodes as taught by Brandes, et al. in the device of Melzner, et al. to capitalize on the semiconducting properties of carbon nanotubes. Page 3, first full paragraph]

In addition, with respect to Brandes, the Patent Office states that:

> First the characterization that Brandes et al. teaches that the nanotubes can not be fixed in both ends is incorrect. The embodiments shown in Brandes et al. (Figures 11 to 13) are

> "various illustrative microelectromechanical devices produced using carbon nanotubes" (Column 9 Lines 1 to 3) and are not limiting to other variations and other embodiments suggested by themselves to those of ordinary skill in the art (Column 10 Lines 17 to 24). These embodiments do illustrate the flexibility and versatility of nanotubes as main agents in microelectromechanical devices properties directly applicable to the device of Melzner et al. Disclosed examples and preferred embodiments do not constitute a teaching away from a broader disclosure or nonpreferred embodiments. *In re Susi, 440 F.2d 442, 169 USPQ 423 (CCPA 1971).* [Office Action, Paragraph No. 3, pages 3-4]

Applicants disagree with the Patent Office on whether these statements constitute an articulate reason, supported with rational underpinning, that allows the Patent Office to come to the conclusion that claim 123 as currently pending is rendered obvious over Brandes and Melzner.

The passages within Brandes cited by the Patent Office are as follows. Column 2, lines 31-40 of Brandes state:

> As used herein, the terms "carbon containing microfibers" and "carbon nanotubes" are used interchangeably. The carbon nanotubes may comprise only a single graphite layer (single-walled nanotubes), or alternatively may include multiple graphite layers (multi-walled nanotubes). A carbon containing microfiber structure may comprise one carbon nanotube or a bundle of many carbon nanotubes. The nanotube may be without defects, or it may contain various degrees of structural defects, impurities or metallic particles atan [sic] extremity (tip) or other portions thereof

Column 8, lines 1-2 (actually, Column 7, line 64 to Column 8, line 2) state:

> A variety of electronic devices can be fabricated to capitalize on the semiconducting properties of carbon nanotubes, using a catalytic growth process.

Column 8, lines 62-66 of Brandes state:

> The unique mechanical and electrical properties of carbon nanotubes enable a variety of novel electromechanical devices to be produced, when a suitable method of incorporating the carbon nanotube (microfiber) into the device is employed.

Column 9, lines 1-3 of Brandes state:

FIGS. 11, 12 and 13 show various illustrative microelectromechanical devices produced using carbon nanotubes.

And column 10, lines 17-24 of Brandes state:

Further, although the invention has been variously disclosed herein with reference to illustrative embodiments and features, it will be appreciated that the embodiments and features described hereinabove are not intended to limit the invention, and that other variations, modifications and other embodiments will suggest themselves to those of ordinary skill in the art. The invention therefore is to be broadly construed, consistent with the claims hereafter set forth.

Also, Figs. 9 and 11-13 of Brandes are reproduced below:

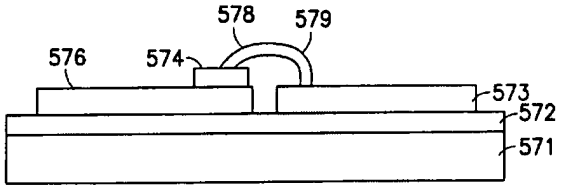

FIG.9A

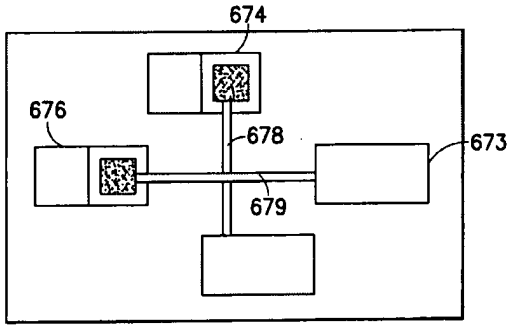

FIG.9B

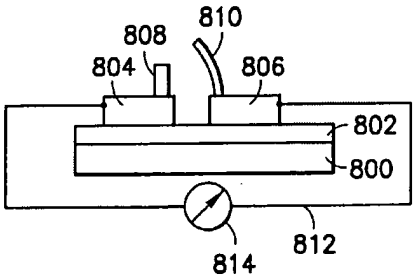

FIG.11

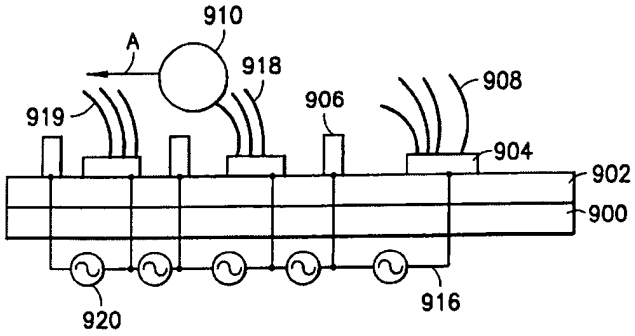

FIG.12

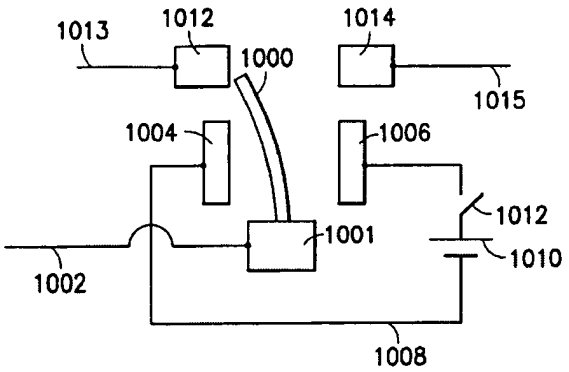

FIG. 13

Some of these figures, and related text, describe nanotubes, fixed at one end, that are movable to connect to an electrical contact at the other end. The example of a crossbar, shown and described with reference to Fig. 9B, is a pn junction, and no mention is made of any movement of wires defining that junction relative to each other in operation, much less any on/off switching, and thus, such an arrangement is not suggested or enabled by Brandes. Specifically, Brandes does not describe any arrangement of wires assembled to define a crossbar intersection switchable between "on" and "off" readable states, bistably, via wire deformation and connection/disconnection to each other as recited in claim 123, much less meeting the many other requirements of this claim. Moreover, the Patent Office appears to agree with this view, since the Patent Office has not relied upon any of the text of the description of Figs. 9A or 9B in its rejections. In Brandes, the wires in Figs. 9A and 9B are described as being fixed; for example, wires 678 and 679 in Fig. 9B are described as forming a "pn junction device" (Column 8, lines 37-47), and it would appear that such a pn junction device would not function if the wires were not in contact with each other. Figs. 11-13 are each directed to carbon nanotubes used as sensors (e.g., 810, 908/918, and 1000), as discussed in Brandes on Column 9, line 4 to Column 10, line 11, and do not show an electrical crossbar array, as recited in claim 123.

Accordingly, as can be seen above, all of the quoted passages and figures cited in Brandes by the Patent Office are mere conclusory statements that state that carbon nanotubes are versatile objects that can be used in a variety of devices. The Patent Office has not pointed to any disclosures in either Brandes or Melzner, beyond mere conclusory statements, that show that claim 123 would

be obvious to one of ordinary skill in the art. Generalized conclusory statements of this nature do not infuse one of ordinary skill in the art, upon reading Brandes, with the specific knowledge of how to make and use a carbon nanotube for the article of claim 123. For example, nowhere does Brandes teach or suggest that a carbon nanotube can be placed under compressive strength such that the nanotube can be deformed and electrically connected, or disconnected, to a conductor, as is recited in claim 123. As the Supreme Court stated in *KSR*, "[R]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness." *KSR*, quoting *In re Kahn*, 441 F.3d 977 (Fed. Cir. 2006).

In re Susi

The Patent Office appears to be of the position that it can make such a conclusion because "Disclosed examples and preferred embodiments do not constitute a teaching away from a broader disclosure or non-preferred embodiments," citing *In re Susi, 440 F.2d 442 (C.C.P.A. 1971).* However, it appears that in the *Susi* case, the applicant there stated that a prior art reference taught away from his claimed compounds simply because these compounds were not described as a "particularly preferred embodiment" in the prior art reference, although the generic formulae in the prior art reference encompassed the compounds as claimed. In other words, *In re Susi* stands for the proposition that although a prior art reference may disclose more than one embodiment, including a preferred embodiment, the prior art reference is also valid prior art for all non-preferred embodiments that are taught by the reference.

In the present application, however, the Patent Office has not yet established that Brandes discloses the claimed invention ("*Disclosed* examples and preferred embodiments do not constitute a teaching away from a broader disclosure or non-preferred embodiments" [emphasis added]), and thus, Applicants do not see how *In re Susi* is relevant to the present rejection. The Patent Office must first point to such a disclosure in Melzner or Brandes, or at least provide some specific articulated reasoning with some rational underpinning of how one of ordinary skill in the art would be able to derive the invention as claimed from the teachings of Melzner or Brandes, instead of pointing to mere conclusory statements to sustain its rejection.

KSR

Lastly, the Patent Office provides another justification for its conclusion that the combination of Brandes and Melzner renders claim 123 obvious, stating that:

> Additionally, all the claimed elements were known in the prior art and one skilled in the ar[t] could have combined the elements as claimed by known methods with no change in their respective functions, and the combination would have yielded predictable results to one of ordinary skill in the art at the time of invention.

However, this reasoning is incorrect, since Brandes is directed to carbon-based nanotube sensors (see the discussion of Figs. 11-13, above), while Melzner is directed to a semiconductor memory device. Thus, the carbon-based nanotube sensors of Brandes would, in fact, *change their function* in the combination of Melzner and Brandes, to the extent that such a combination could even be formed. Accordingly, this reasoning cannot stand.

The Patent Office also alleges the combination of Brandes and Melzner would be predictable. As has been previously requested by the Applicants, in order for the Patent Office to conclude that the combination of references is predictable, the Patent Office must point to some evidence that supports its conclusion; mere conclusory statements, without any support, are insufficient. The combination of a memory device and a sensor is nonsensical, and the Patent Office has not explained or suggested that one of ordinary skill in the art would have recognized that the combination of a memory device and a sensor device would lead to a predictable outcome, nor has the Patent Office identified a finite number of identified, predictable potential solutions where a component of a memory device could be replaced with a component of a sensor in order to reach the claimed invention. The memory device of Melzner is a device that is useful for storing data, while the sensor of Brandes is directed to detecting mechanical motion. What would be stored, and what would be sensed? What would be substituted with what? Would the sensor elements themselves also store bits of memory? Would the memory elements of the memory device, used for storing bits of data, also be simultaneously used to determine when the memory device was moved? While a person of ordinary skill in the art is assumed to be a person of ordinary creativity, the Patent Office has not, to date, explained why even a person of even ordinary creativity would have been able to predictably combine a memory device and a sensor to form an

article as claimed in claim 123 (and with no change in either of their respective functions), or why this combination would have been predicted by one of ordinary skill in the art.

To the extent that the Patent Office believes that such a finding has been made, which Applicants do not concede, Applicants will submit a Declaration under separate cover from one of the inventors, Professor Charles Lieber, supporting the conclusion that combination suggested by the Patent Office would not lead to a predictable result, and instead would result in a non-functional device.

CONCLUSION

In view of the foregoing remarks, this application should now be in condition for allowance. A notice to this effect is respectfully requested. If the Examiner believes, after this response, that the application is not in condition for allowance, the Examiner is requested to call the undersigned at the telephone number listed below.

Applicant believes no fee is due with this response. However, if a fee is due, please charge our Deposit Account No. 23/2825 under Docket No. H0498.70112US01 from which the undersigned is authorized to draw.

Dated: 04/02/09

Respectfully submitted,

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